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O 34. THE PLANT SPECIES ALTERNATIVE TO GRASS IN GREEN AREA

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ABSTRACT: Especially in the current period, various problems such as drought, deterioration of ecological balance, climate crisis are experienced. For this reason, we need to contribute to a more livable world. We should consider important points within the scope of landscaping works; The most important of these is the economical use of water. For this, it is necessary to use less water and to consume the water economically. Grasses, which are widely used in landscape architecture studies, are plants that need frequent watering. Within the scope of this study, alternative plants were handled instead of grass plants, which are frequently used in landscaping studies but have a high water consumption. Information has been given about alternative plants, and their various features and areas of use, which consume much less water, can be produced easily and quickly, spread quickly, and require much less cost.

Keywords*: Landscape plants, grass, environment and green area*

INTRODUCTION

Grass is a term generally used for plants that are very close to the ground, that grip and cover the soil firmly.
It refers to the artificially established green field surfaces that cover the soil surface, tightly growing, have a homogeneous appearance, are constantly cut and kept short. In some conditions legumes or rarely species from other families are used (Gülgün et al., 2015). In the grass areas, the mixture formed as a result of mixing at least 2 or more 3-5 species that complement each other's properties is applied (Özsafak and Öner, 2021). It is important plant for light green areas. Many studies reported grass plants were importance in landscape area (Temizel et al., 2017; Yazici and Gülgün, 2017; Akça and Yazici, 2017; Yazici and Ünsal, 2019; Yazici and A. Sağlamer, 2019).

MAINTENANCE NEEDS OF GRASS AREAS

Water Requirement of Grass

- Grass cannot survive without water. They meet their water needs, especially when rainfall is intense. However, the water needs of the grass increase in the late spring and summer months when the rainfall decreases.
- The areas where the best turf yield is obtained are the areas where intensive irrigation is made at intervals.
- The average weekly water need of a lawn is 2.5-3 cm. This need can be doubled in summer. (https://www.uzmangrupcevre.com.tr/cevredetay/100)

Figure 1. Grass irrigation and cooling (Url 1)

- According to the season, 25 to 40 liters of water per square meter is required in an irrigation period.
- Grass areas are separated from other green areas due to the high amount of water need.
- Calculation of the amount of water to be used for the lawn areas, the labor cost required for irrigation and the cost of the equipment needed for irrigation of the grass areas reach high costs.

FERTILIZATION

Since the grass areas are irrigated frequently, they quickly lose the organic substances they contain. Because the shape of the grass is densely made, their fertilizer needs are higher than other plants. It is necessary to do the fertilization process three times in spring, early summer and autumn. When we consider the ecological and economic aspects, it would be more logical to make alternative applications instead of grass areas (Url 2).

Figure 2. Fertilization (Url 3)

PLANTS THAT CAN BE USED IN PLACE OF GRASS

- Since the lawn needs frequent irrigation, we should prefer to use alternative plant species in order to save water and reduce maintenance costs.
- We need to take precautions especially in the current period, with the droughts, deterioration of the ecological balance, climate crisis and similar situations.
- Using ground cover plants, which are an alternative to grass, will support the existence of an economical, ecological, environmentally friendly and sustainable nature.
- At the same time, it will support and develop wildlife.
- It is the right way to prevent the extinction of many plant species.

Cerastium tomentosum (Summer snow plant)

- It is a herbaceous plant with an average height of 5-10 cm.
- It develops well in well-drained soils. It can also grow in dry soils.
- It is resistant to frost.
- It can grow in sunny and semi-shaded areas.

- Water demand is low.
- There is no format request.

It can be used in rock gardens, curbs, while creating natural gardens (Url 4)

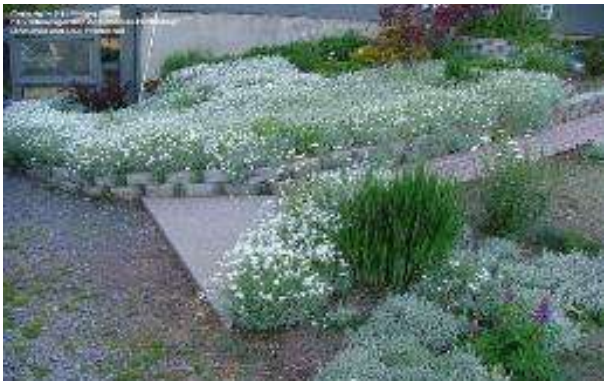


Figure 3. The use of *Cerastium tomentosum* in herbal design (Url 5)

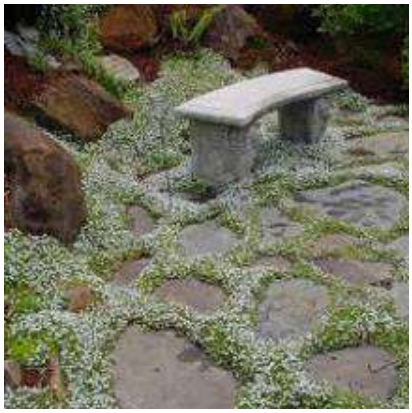


Figure 4. The use of *Cerastium tomentosum* in herbal design (Url 6)

Ajuga reptans (Yeast Herb)

- It is a perennial evergreen ground cover with an average length of 20 cm.
- Flowers begin to open in March.
- It is a temperate climate plant.
- Likes sunny and bright places, but can also grow in semi-shaded areas.
- It is sensitive to frost.
- Is content with soil, but develops better in moist soils.
- Water demand is low.
- Can be used as ground cover, border border in rock gardens (Url 7).

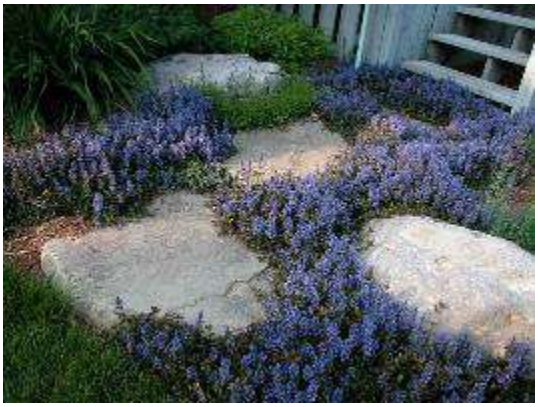


Figure 5. Ajuga reptans stepping stone use (Url 8)

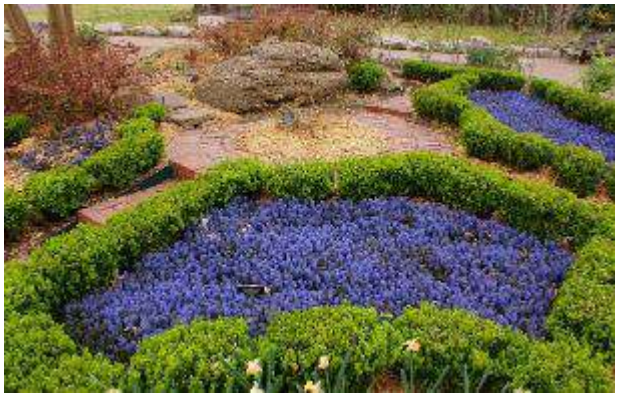


Figure 6. Use of *Ajuga reptans* in herbal design (Url 9)

Trifolium repens (White Clover Plant)

- It is a short, perennial herbaceous plant that covers the surface of the soil.
- They spread by forming a stolon.
- They bloom white and pink in summer.
- It is a cool climate plant. It is resistant to cold and frost.
- It is resistant to compression.
- It can grow in shady areas.
- They are preferred in pastures due to their high nutritional value.

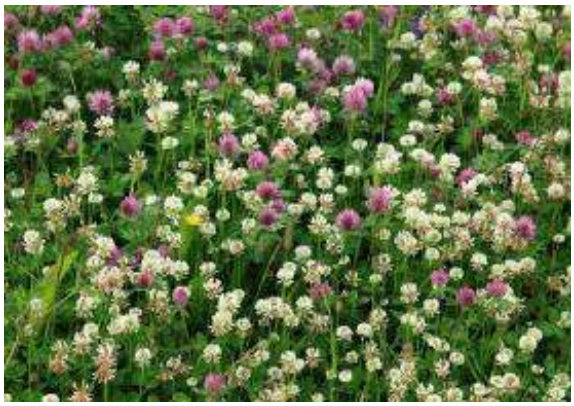


Figure 7. *Trifolium repens* (Url 10)

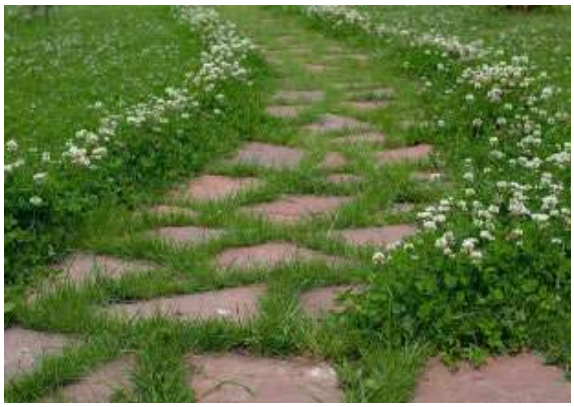


Figure 8. *Trifolium repens* (Url 11)

Vinca major (Algerian Violet Plant)

- It is a perennial herbaceous plant that can grow 15-20 cm.
- It starts to spread from its shoots in the spring.
- It is covered with purple flowers for a long time of the year.
- It is a cold climate plant, resistant to frost.
- It can adapt to any climate.
- Resistant to shade and satisfied with soil.
- It can be evaluated in terms of softening the curbs.
- Can be used under trees.

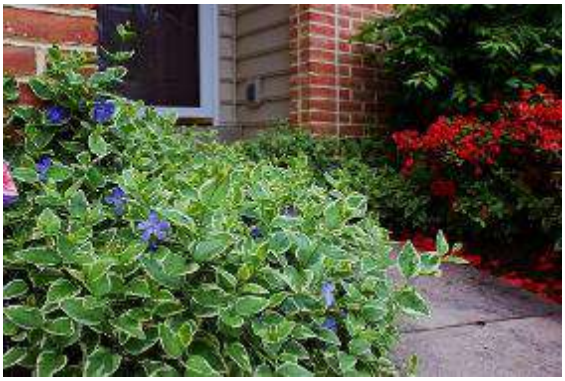


Figure 9. *Vinca majör* (Url 12)

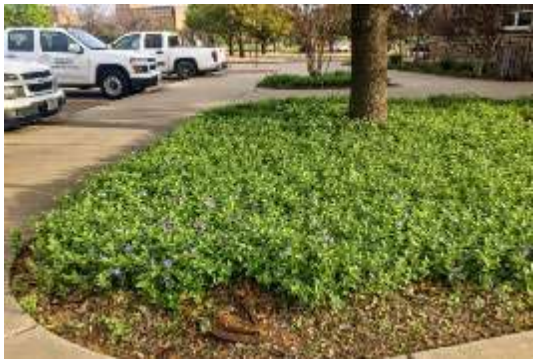


Figure 10. *Vinca major* (Url ,13)

Pachysandra terminalis (Japanese Broom Plant)

- It is a perennial herbaceous ground cover that can grow 15-20 cm in length.
- It blooms with green flowers in winter and summer and not showy white flowers in spring.
- It is highly resistant to shade, cold and drought.
- It needs less water.
- It is not suitable for printing.
- It can be used under trees, in rock gardens and borders.

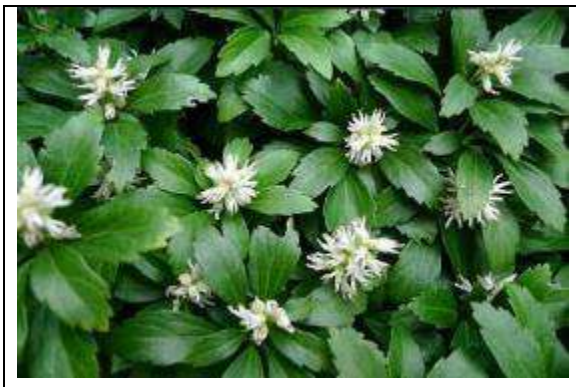


Figure 11. Pachysandra terminalis (Url 14)

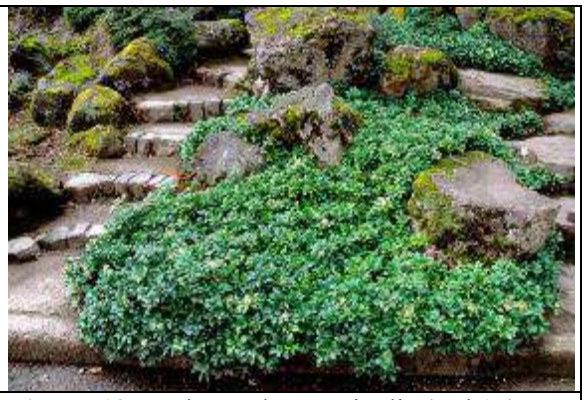


Figure 12. Pachysandra terminalis (Url 15)

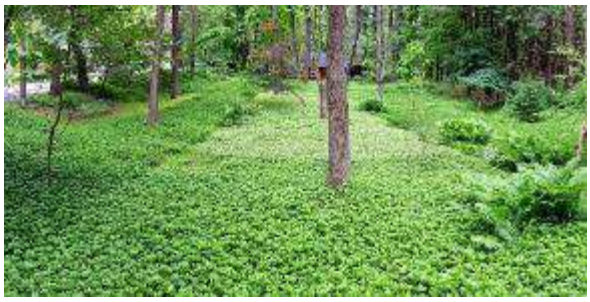
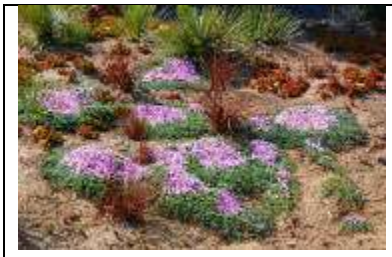


Figure 13. Pachysandra terminalis (Url 16)

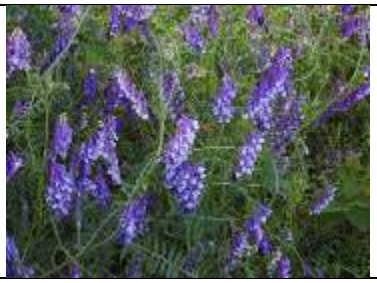
Ruschia lineolata (Star Carpet Plant)

- It is an evergreen, perennial succulent type ground cover that can grow 5-10 cm in length.
- Purple flowers bloom in spring.
- It is a hot climate plant but resistant to cold weather.
- It develops well in permeable soils.
- Highly resistant to thirst.
- It is resistant to short presses.
- Can be used in rock gardens, arid areas and to prevent weeds.



Ruschia lineolata

Ruschia lineolata



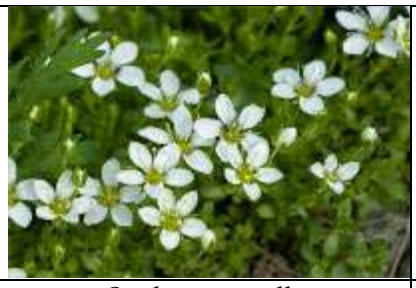
Vicia sp

Figure 14. (Url 17; Url 18; Url 19).

Arenaria verna (Irish Moss)

- It has 10-15 cm long dark green leaves resembling moss.
- It is a herbaceous perennial plant that blooms with small, not very effective white flowers in summer.
- It can adapt to many climates.
- It grows well in sunny areas.
- It is a very durable species.
- Since its roots are on the surface, irrigation should be done less and continuously.
- It can be used as an emphasis between step stones, in rock gardens, borders and woodland environments.


Arenaria verna

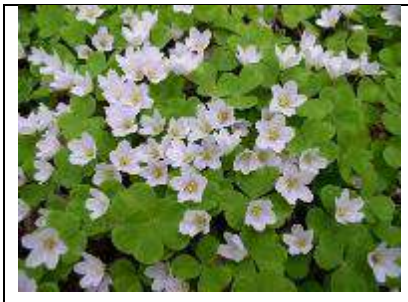

Oxalis acetosella


Arenaria verna

Figure 15. (Url 20; Url 21; Url 22)

Oxalis acetosella (Sour clover)

- It can be lengthened up to 30 cm. It shows rapid development.
- It can develop in congested soils. It does not need aeration of the soil.
- It is resistant to arid and semi-arid conditions.
- It grows well in both sun and half shade.
- It is an invasive plant species. Therefore, there is no need to fight weeds.
- Water demand is low.
- It can remain green in dry seasons as it has deep roots.
- It does not need to be cut.
- It meets the nitrogen need of the soil.
- Produces white or pink flowers that attract beneficial pollinators such as bees and butterflies (Url 23).

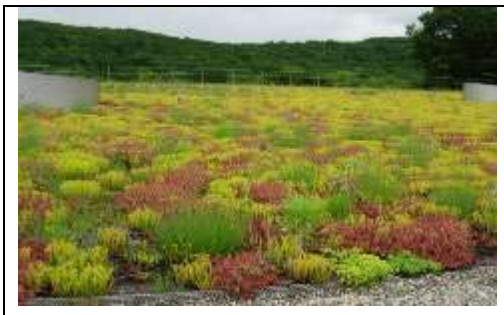

Oxalis acetosella


Oxalis acetosella

Figure 16. (Url 24; Url 25)

Sedum sp. (Roof Grove)

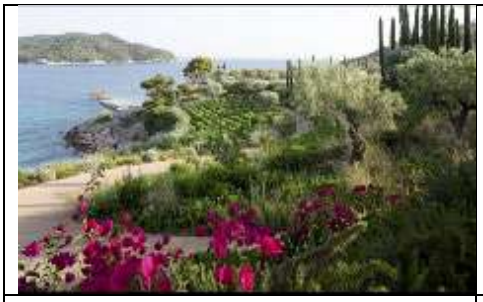
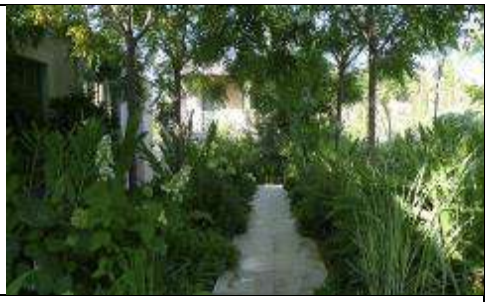
- Succulent, spreading by soil shoots, is an evergreen perennial plant.
- Their height does not exceed 5-8 cm.
- Leafy succulent, in various forms and sizes.
- It thrives well in well-drained, full sun or slightly shaded areas.
- It is very resistant to drought.
- It grows well in soils that are poor in nutrients.
- It should be watered less.
- Highly resistant to cold (Url 26)




Sedum sp.

Figure 17. (Url 27; Url 28)

SAMPLE STUDIES WITH COVER PLANTS

Garden in Greece (Url 29)

Plants *Used Oryzopsis sp.* , *Hyparrhenia* sp.(Url 30)


Oryzopsis sp

Hyparrhenia sp

Figure 18. (Url 31;Url 32)


Lurie Garden

High Line

	
High Line	Plant used; Arenaria verna Eye-catching designs can be created by using wheatgrass, ground cover plants, shrubs and trees together.

Figure 19. (Url 33;Url 34; Url 35)

There are 4 different Sedum and 11 different Allium species in the area. It hosts a total of 354 plant species. The plants in the area are mostly irrigated with rain water and they do not need irrigation systems much. It has a great riot of colors every season**.**

	
Shop & Trade Complex, PLANT USED IN PICTURE; Stipa sp. (Sorbet Grass) It is resistant to extreme cold and heat. Likes sunny environments, gives dynamism to the design. If it is pruned, it gives thicker shoots.	PLANT USED; Perovskia atriplicifolia (Russian sage) can grow up to 2 m in length. •They like hot climates. •It has the ability to clean contaminated soils. •Likes sunny and semi-shaded places. •It has fragrant flowers.
	
Hermes Company Building, Plant Used; Panicum virgatum •Perennial, hot climate wheat. •2 years after planting, it becomes able to fight with weeds. •It is a good fodder plant.	PLANT USED; Phyla nodiflora (Libyan grass) • It is a perennial herbaceous ground cover. •It is blooming from April to August. • Sun-loving, semi-shade resistant. • It can grow in any type of soil. • It needs less maintenance.

	
Plant used; Geum triflorum • It is a plant native to North America. • It can be 15-45 cm tall. • It is a plant that attracts bees. • It grows well in sunny areas.	

Figure 20 (Url 36; Url 37; Url 38; Url 39; Url 40)

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